



## DEPARTMENT OF TRANSPORTATION

MATERIALS TRANSPORTATION BUREAU

WASHINGTON, D.C. 20590

37427

### [ 49 CFR Part 175 ]

[ Docket No. HM-152; Notice No. 77-6 ]

#### CARRIAGE BY AIRCRAFT

##### Requirements for Radioactive Materials

AGENCY: Materials Transportation Bureau (MTB), Department of Transportation (DOT).

ACTION: Notice of proposed rulemaking.

**SUMMARY:** The purpose of this proposed amendment to Part 175 of the Hazardous Materials Regulations is to: (1) reduce the maximum and average radiation level in the passenger compartment of passenger-carrying aircraft by increasing the separation distance required between any package of radioactive materials and the passenger compartment, and by reducing the maximum allowable transport index from 10.0 to 3.0 for any package of radioactive materials carried on a passenger-carrying aircraft; (2) provide for a system of predesignated areas ("spacing out") for stowage of radioactive materials packages aboard passenger-carrying aircraft based on the size and configuration of the particular aircraft involved; (3) increase the allowable amount of radioactive materials aboard cargo-only aircraft when carried in accordance with amended loading requirements; (4) restrict the carriage of radioactive materials aboard passenger-carrying aircraft to those with a radioactive half-life of 30 days or less; and (5) establish provisions for combining radioactive materials packages in overpacks. These proposed revisions are based primarily on a study conducted by the U.S. Atomic Energy Commission (see Supplementary Information in this document) which recommended a reduction in the exposure to radioactive materials for passengers aboard aircraft.

**DATES:** Comments by: September 20, 1977.

**ADDRESS COMMENTS TO:** Section of Dockets, Office of Hazardous Materials Operations, Department of Transportation, Washington, D.C. 20590. It is requested that five copies be submitted.

#### FOR FURTHER INFORMATION CONTACT:

A. W. Grella or B. D. Devine, Office of Hazardous Materials Operations (OHMO), Technology Division, 2100 2nd Street SW., Washington, D.C. 20590 (202-426-2811).

#### SUPPLEMENTARY INFORMATION:

In July of 1974, the U.S. Atomic Energy Commission (AEC) transmitted to the Federal Aviation Administration (FAA) of the Department of Transportation several recommendations regarding the transportation of radioactive materials aboard civil aircraft ("Recommendations for Revising Regulations Governing the Transportation of Radioactive Material in Passenger Aircraft," July, 1974, on public file in the Section of Dockets, Office of Hazardous Materials Operations, 2100 2nd Street, SW., Washington, D.C.). These recommendations have been under review and have been the subject of discussions between the staffs of the two agencies and the successors to the AEC, the U.S. Nuclear Regulatory Commission (USNRC) and the Energy Research and Development Administration (ERDA). The MTB has evaluated these recommendations and the several discussions held thereon, and believes that they provide a basis for the proposals in this document to reduce the radiation exposure to persons aboard aircraft transporting radioactive materials.

The proposed rules would revise § 175.700, applicable only to passenger-carrying aircraft, to restrict the carriage of radioactive materials packages required to bear a Radioactive Yellow-III label to those with a transport index of 3.0 or less. Additionally, in order to insure the least amount of potential exposure to passengers, the proposed rules would require each radioactive material package required to bear a Radioactive Yellow-II or Radioactive Yellow-III label to be stowed on the floor of the cargo compartment of the aircraft. Furthermore, a package required to bear either of those labels could be carried on a passenger-carrying aircraft only if the radioisotope it contains has a radioactive half-life that does not exceed 30 days. Exceptions to the half-life restriction would be provided for radioactive materials that are susceptible to rapid chemical deterioration (such as those requiring dry ice refrigeration), those having a half-life exceeding 10<sup>6</sup> years (such as natural or depleted uranium), and certain export or import shipments as specifically approved by the Director, OHMO.

A new § 175.701 is proposed, setting forth minimum spacing distances between people or animals and packages of radioactive materials carried aboard passenger-carrying aircraft. This section would replace the required separation distances contained in existing § 175.700.

The proposed new § 175.701 would permit the aircraft operator to develop a system of predesignated areas for the stowage of packages of radioactive materials aboard passenger-carrying aircraft.

The specific details of the proposed use of such a "spacing out" system by an aircraft operator would be required to be approved by the Director, MTB. Under this proposal, a system of predesignated areas would be approved by the Director if it were designed to assure that: (1) the packages are placed in each predesignated area in accordance with § 175.701 (a); and (2) the predesignated areas are laterally separated from each other by at least four times the applicable distance specified in the table in § 175.701 (b) (2) as measured in accordance with § 175.701 (b) (1). These proposals are intended to preclude any radiation level "peaking" from the cumulative effect of radiation emitted from each predesignated area.

Proposals to amend §§ 175.75(a)(3) and 175.702 would provide for an increase in the amount of radioactive material permitted to be carried aboard a cargo-only aircraft, and would set forth the requirements for stowage in such situations. Current § 175.75(a)(3) limits the maximum quantity of radioactive materials that may be carried aboard an aircraft to an amount that totals a transport index of 50. It is proposed to amend § 175.75(a) to increase the maximum amount that may be carried aboard a cargo-only aircraft to a total transport index of 200. More specifically, under proposed § 175.702, when the total transport index does not exceed 50, the separation distance requirements applicable to passenger-carrying aircraft would apply to cargo-only aircraft. However, when the transport index of all packages exceeds 50, the proposal would require a minimum separation distance of 30 feet (9 meters). Additionally, in such cases, groups of packages would be limited to a transport index of 50, with each group separated from every other group by not less than 20 feet (6 meters). When packages of fissile radioactive materials are being carried, the total transport index for any aircraft would be limited to a maximum of 50, rather than 200, to assure nuclear criticality safety.

A new § 175.703 is proposed to incorporate the existing requirements of § 175.700 for separation of radioactive materials packages from undeveloped film. The new section would also provide conditions for overpacking or "bagging" or properly marked and labeled packages of radioactive materials within an outer enclosure such as a heavy gauge plastic bag or a fiberboard box. Present requirements for labeling and transport index determinations do not address this situation. The proposed procedures would specify the conditions for such use.

The provisions of present § 175.710 would be incorporated into proposed new § 175.103. Therefore, it is proposed that § 175.710 be deleted.

The Office of Hazardous Materials Operations has determined that there will be no adverse effect on the environment resulting from the changes proposed herein. This position is supported by the Battelle Pacific Northwest Laboratories Study, "Assessment of the Environmental Impact of the FAA Proposed Rule-making Affecting the Conditions of Transport of Radioactive Materials on Aircraft" (BNWL-B-421), on file in the Section of Dockets, Room 6500, Office of

Hazardous Materials Operations, Department of Transportation, 2100 2nd Street SW., Washington, D.C.

Primary drafters of this document are B. D. Devine and A. W. Grella of the Office of Hazardous Materials Operations, Technology Division, J. N. Stottlmyer of the Office of Hazardous Materials Operations, Regulations Development Branch, and G. W. Tenley of the Office of the Assistant General Counsel for Materials Transportation Law.

The following is a summary of existing radioactive materials regulatory provisions and those which are being proposed:

| Item                               | Existing regulations                        | Proposed regulations   |
|------------------------------------|---|--|
| Package: Maximum transport index:  |   |  |
| Passenger.....                     | 10 (sec. 173.393(i))                        | 3 (sec. 175.700).  |
| Cargo.....                         | Same.                                       | No change.   |
| Stowage: Total T. I. per aircraft: |   |  |
| Passenger.....                     | 50 (sec. 175.75)                            | No change.   |
| Cargo.....                         | Same.                                       | 200 (sec. 175.75). (50 for fissile materials.)   |
| Configuration:                     |   |  |
| Passenger.....                     | Separation table (sec. 175.700)             | Separation table or predesignated area (sec. 175.701). Yellow labeled packages on floor only (sec. 175.700). |
| Cargo.....                         | Same.                                       | Separation table for single group (sec. 175.701) or multiple groups (sec. 175.702).                          |
| Film protection.....               | Separation table (sec. 175.700).            | No changes (sec. 175.703).   |
| Overpack T. I.:                    |   |  |
| Passenger.....                     | Not addressed.                              | 3 (sec. 175.703).  |
| Cargo.....                         | do.   | 10 (sec. 175.700).   |
| Half life.....                     | do.   | Less than or equal to 30 d, with exceptions (sec. 175.700).  |
| End use:                           |   |  |
| Passenger.....                     | Research or medical use only (sec. 175.30). | No change.   |
| Cargo.....                         | No restriction.                             | No change.   |

In consideration of the foregoing, Part 175 of Title 49 Code of Federal Regulations would be amended as follows:

1. Part 175 Table of Sections would be amended by revising § 175.700, adding new §§ 175.701, 175.702, and 175.703, and § 175.710 would be deleted:

|         |  |
|---------|--|
| Sec.    |  |
| 175.700 | Special limitations; radioactive materials packages in passenger-carrying aircraft.                            |
| 175.701 | Separation distance requirements for packages containing radioactive materials in passenger-carrying aircraft. |
| 175.702 | Requirements for carriage of packages containing radioactive materials in cargo-only aircraft.                 |
| 175.703 | Other special requirements for the acceptance and carriage of packages containing radioactive materials.       |

2. Section 175.75 paragraph (a) (3) would be revised to read as follows:

§ 175.75 Quantity limitations aboard aircraft.

(a) \* \* \*

(3) Packages containing radioactive materials when their combined transport index number (determined by adding together the transport index numbers shown on the labels of the individual packages)—

(i) In passenger-carrying aircraft, exceeds 50.

(ii) In cargo-only aircraft, exceeds 200 (For fissile radioactive materials, see § 175.702(b) (3)).

#### § 175.85 [Amended]

3. Section 175.85 paragraph (d) would be amended by changing the section reference 175.700 in the last line to read "§ 175.701."

4. Section 175.700 would be revised to read as follows:

§ 175.700 Special limitations; radioactive materials packages in passenger-carrying aircraft.

(a) No person may carry in a passenger-carrying aircraft any package required to be labeled in accordance with § 172.403 (c) or (d) of this subchapter unless—

(1) Where the package is required to be labeled Radioactive Yellow-II, the transport index does not exceed 1.0;

(2) Where the package is required to be labeled Radioactive Yellow-III, the transport index does not exceed 3.0;

(3) The package is carried on the floor of the cargo compartment;

(4) The package is carried in the aircraft in accordance with §§ 175.85(d), 175.701 and 175.703(c); and

(5) Except as provided in paragraph (b) of this section, the radioisotope specified on the label—

(i) Has a half-life not exceeding 30 days;

(ii) Has a half-life exceeding 10<sup>4</sup> years; or

(iii) Is a material that is susceptible to rapid chemical deterioration, as shown by a shipper's statement to that effect on the shipper's certificate.

(b) The Director, Office of Hazardous Materials Operations may approve specific export or import shipments of radioactive materials which do not meet the requirements of paragraph (a) (5) of this section.

(c) In addition to the reporting requirements of § 175.45, the carrier must also notify the shipper at the earliest practicable moment following any incident in which there has been breakage, spillage, or suspected radioactive contamination involving radioactive materials and shipments. Aircraft in which radioactive materials have been spilled may not again be placed in service or routinely occupied until the radiation dose rate at any accessible surface is less than 0.5 millirem per hour and there is no significant removable radioactive surface contamination as determined in accordance with § 173.397 of this subchapter. When contamination is present, the package or materials must be segregated as far as practicable from personnel contact. If radiological advice or assistance is needed, the U.S. Energy Research and Development Administration must also be notified. In case of obvious leakage, or if it appears likely that the inside container may have been damaged, care must be taken to avoid inhalation, ingestion, or contact with the radioactive materials. Any loose radioactive materials must be left in a segregated area pending disposal instructions from qualified persons.

5. A new § 175.701 would be added read as follows:

§ 175.701 Separation distance requirements for packages containing radioactive materials in passenger-carrying aircraft.

(a) General. No person may carry in a passenger-carrying aircraft any package required by § 172.403 of this subchapter to be labeled Radioactive Yellow-II or Radioactive Yellow-III unless the package is placed in the aircraft in accordance with the minimum separation distances prescribed in paragraph (b) or (c) of this section.

(b) Separation distances. (1) Except as provided in paragraph (c) of this section, the minimum separation distances prescribed in paragraph (b) (3) of this section are determined by measuring the shortest distance between the surfaces of the radioactive materials package and the surfaces bounding the space occupied by passengers or animals. If more than one package of radioactive materials is placed in a passenger-carrying aircraft, the minimum separation distance for each individual package shall be determined in accordance with paragraph (b) (2) of this section on the basis of the sum of the transport index numbers of the individual packages.

(2) The following table prescribes minimum separation distances for the carriage of packages containing radioactive materials labeled Radioactive Yellow-II or Radioactive Yellow-III in passenger-carrying aircraft:

| Transport index or sum of transport indexes of all packages in the aircraft | Minimum separation distances |             |
|---|------------------------------|-------------|
|   | Inches                       | Centimeters |
| 0.1 to 1.0  | 12                           | 30          |
| 1.1 to 2.0  | 20                           | 50          |
| 2.1 to 3.0  | 28                           | 70          |
| 3.1 to 4.0  | 34                           | 85          |
| 4.1 to 5.0  | 40                           | 100         |
| 5.1 to 6.0  | 46                           | 115         |
| 6.1 to 7.0  | 52                           | 130         |
| 7.1 to 8.0  | 57                           | 145         |
| 8.1 to 9.0  | 61                           | 155         |
| 9.1 to 10.0   | 65                           | 165         |
| 10.1 to 11.0  | 69                           | 175         |
| 11.1 to 12.0  | 73                           | 185         |
| 12.1 to 13.0  | 77                           | 195         |
| 13.1 to 14.0  | 81                           | 205         |
| 14.1 to 15.0  | 85                           | 215         |
| 15.1 to 16.0  | 89                           | 225         |
| 16.1 to 17.0  | 93                           | 235         |
| 17.1 to 18.0  | 97                           | 245         |
| 18.1 to 19.0  | 101                          | 255         |
| 19.1 to 20.0  | 105                          | 265         |
| 20.1 to 21.0  | 109                          | 275         |
| 21.1 to 22.0  | 113                          | 285         |
| 22.1 to 23.0  | 117                          | 295         |
| 23.1 to 24.0  | 121                          | 305         |
| 24.1 to 25.0  | 125                          | 315         |
| 25.1 to 26.0  | 129                          | 325         |
| 26.1 to 27.0  | 133                          | 335         |
| 27.1 to 28.0  | 137                          | 345         |
| 28.1 to 29.0  | 141                          | 355         |
| 29.1 to 30.0  | 145                          | 365         |

(c) **Pre-designated areas.** A package required by § 172.403 of this subchapter to be labeled Radioactive Yellow-II or Radioactive Yellow-III may be carried in a passenger-carrying aircraft in accordance with a system of pre-designated areas established by the aircraft operator. Each aircraft operator that elects to use a system of pre-designated areas shall submit a detailed description of the proposed system to the Director, Office of Hazardous Materials Operations for approval prior to implementation of the system. A proposed system of pre-designated areas is approved if the Director determines that it is designed to assure that—

(1) The packages can be placed in each pre-designated area in accordance with the minimum separation distances prescribed in paragraph (b) (2) of this section; and

(2) The pre-designated areas are laterally separated from each other by a minimum distance equal to at least four times the distance required by paragraphs (b) (1) and (b) (2) of this section for the pre-designated area containing packages with the largest sum of transport indexes.

6. A new § 175.702 would be added to read as follows:

§ 175.702 Requirements for carriage of packages containing radioactive materials in cargo-only aircraft.

(a) As used in this section, the term "group of packages" means packages that are separated from each other in an aircraft by a distance of 20 feet (6 meters) or less.

(b) No person may carry in a cargo-only aircraft any package required by § 172.403 of this subchapter to be labeled Radioactive Yellow-II or Radioactive Yellow-III unless—

(1) When the total transport index for all of the packages does not exceed 50.0, the package is carried in accordance with § 175.701(a).

(2) When the total transport index for all of the packages exceeds 50—

(i) The separation distance between the surfaces of the radioactive materials package and the surfaces bounding the space occupied by persons or animals is at least 30 feet (9 meters);

(ii) The transport index for any group of packages does not exceed 50.0; and

(iii) Each group of packages is separated from every other group in the aircraft by not less than 20 feet (6 meters), measured from the outer surface of each group.

(3) For fissile radioactive materials, the total transport index for all packages does not exceed 50.0.

7. A new § 175.703 would be added to read as follows:

§ 175.703 Other special requirements for the acceptance and carriage of packages containing radioactive materials.

(a) No person may carry in an aircraft any package of radioactive materials required by § 172.403 of this subchapter to be labeled Radioactive Yellow-II or Radioactive Yellow-III closer than the distances shown in the following table to any package marked as containing undeveloped film:

| Transport index | Minimum separation distance in feet to nearest undeveloped film for various times of transit |          |          |           |           |
|-----------------|--|----------|----------|-----------|-----------|
|                 | Up to 1 h  | 2 to 4 h | 4 to 8 h | 8 to 12 h | Over 12 h |
| None            | 0  | 0        | 0        | 0         | 0         |
| 0.1 to 1.0      | 1  | 2        | 3        | 4         | 5         |
| 1.1 to 5.0      | 3  | 4        | 6        | 8         | 11        |
| 5.1 to 10.0     | 4  | 6        | 9        | 11        | 15        |
| 10.1 to 20.0    | 5  | 8        | 12       | 16        | 23        |
| 20.1 to 30.0    | 7  | 10       | 16       | 20        | 29        |
| 30.1 to 40.0    | 8  | 11       | 17       | 22        | 33        |
| 40.1 to 50.0    | 9  | 12       | 19       | 24        | 36        |

(b) No person may accept for carriage in an aircraft packages of radioactive materials contained in a rigid or non-rigid overpack, including a fiberboard box or plastic bag, unless—

(1) The packages of radioactive materials contained within the overpack comply with the packaging, marking, and labeling requirements of this subchapter; and

(2) The overpack is labeled as prescribed in § 172.403 of this subchapter and complies with the following requirements:

(i) If the radiation dose rate for the overpack exceeds 1.0 millirem per hour at 3 feet (0.9 meters) from any surface, the Radioactive Yellow-III label prescribed in § 172.440 of this subchapter must be applied. The "contents" entry on that label must state "mixed radioactive materials."

(ii) For a non-rigid overpack, a single required label together with required markings must be affixed to the overpack by means of a securely attached, durable tag. The transport index must be determined by adding together the transport indexes of the radioactive materials packages contained therein.

(iii) For a rigid overpack, the transport index must be determined by—

(A) Adding together the transport indexes of the radioactive materials packages contained in the overpack; or

(B) Except for fissile radioactive materials, direct measurement as prescribed in § 173.389(d) (1) of this subchapter.

(iv) The overpack with the inner packages contained therein, must be capable of withstanding the compression test prescribed in § 173.398(b) (3) (v) of this subchapter.

(v) The overpack must be marked as prescribed in Subpart D of Part 172 and § 173.25(a) of this subchapter.

(vi) The transport index of the overpack may not exceed 3.0 for passenger-carrying aircraft shipments, nor 10.0 for cargo-only aircraft shipments.

(vii) The overpack is considered a single package for purposes of the shipping paper requirements in Subpart C of Part 172 of this subchapter.

(viii) The overpack may not contain packages consolidated from more than one original shipper.

(c) No person may carry in an aircraft any package containing Fissile Class III radioactive materials (as defined in § 173.389(a) (3) of this subchapter), except—

(1) In a cargo-only aircraft which has been assigned for the sole use of the shipper for the specific shipment of fissile radioactive material. Instructions for the sole use must be developed by the shipper and carrier, and the instructions issued with the shipping papers; or

(2) In an aircraft in which there are no other packages required to bear a radioactive label as prescribed in § 172.403 of this subchapter. Specific arrangements must be made between the shipper and carrier, with instructions to that effect issued with the shipping papers; or

(3) In accordance with any other procedure specifically approved by the Director, Office of Hazardous Materials Operations.

§ 175.710 [Deleted]

8. § 175.710 would be deleted.

(49 U.S.C. 1803, 1804, 1807, 1808; 49 CFR 1.53(e).)

NOTE.—The Materials Transportation Bureau has determined that this document does not contain a major proposal requiring preparation of an Inflation Impact Statement under Executive Order 11821 and OMB Circular A-107.

Issued in Washington, D.C., on July 12, 1977.

ALAN I. ROBERTS,  
Director, Office of Hazardous  
Materials Operations.

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